

WHAT IS CLAIMED IS:

1. A computer system, comprising:
  - a plurality of virtual machines formed on a control program of a computer; and
- 5       an I/O device connected to a PCI bus of said computer and shared among said plurality of virtual machines; wherein said computer system further includes:
  - a single port disposed in said I/O device and connected to said PCI bus;
- 10      PCI connection allocating means for setting a state of logical connection between selected one of said plurality of virtual machines and said port; and  
I/O device switching means for updating said state of logical connection set by said PCI connection allocating
- 15     means according to a control signal received from said selected virtual machine,  
wherein said selected virtual machine changes its state of logical connection to said I/O device according to the setting by said PCI connection allocating means.
- 20     2. The computer system according to claim 1,  
wherein said I/O device switching means includes interrupting means for updating the setting by said PCI connection allocating means and generating an interruption to notify said selected virtual machine of a change of said state of logical connection to said I/O device, and

wherein said virtual machine, when receiving said interruption, changes its state of logical connection to said I/O device according to the setting by said PCI connection allocating means.

5       3. The computer system according to claim 1,  
          wherein said selected virtual machine includes error  
          detecting means for detecting error occurrence in another  
          virtual machine and when such an error is detected, said  
          virtual machine sends a predetermined control signal to said  
10      I/O device switching means.

        4. The computer system according to claim 2,  
          wherein said virtual machine includes first and  
          second virtual machines,  
          wherein said second virtual machine, when an error is  
15      detected in said first virtual machine, sends a  
          predetermined control signal to said I/O device switching  
          means and connects the port of said I/O device to said second  
          virtual machine, and

          wherein said control program activates said second  
20      virtual machine and lets said first virtual machine stand  
          by.

5. A computer system, comprising:  
          a plurality of physical partitioned computers formed  
          by partitioning a computer physically; and

an I/O device connected to a PCI bus of said computer and shared among said plurality of physical partitioned computers,

wherein said system further includes:

5       a single port disposed in said I/O device and connected to said PCI bus; and

          a PCI connection allocating means for setting a state of logical connection between selected one of said plurality of physical partitioned computers and said port; and

10       I/O device switching means for updating said state of connection set by said PCI connection allocating means according to a control signal received from said selected physical partitioned computer,

          wherein said selected physical partitioned computer  
15      changes its state of logical connection to said I/O device according to the setting by said PCI connection allocating means.

6. The computer system according to claim 5,  
      wherein said I/O device switching means includes  
20      interrupting means for updating the setting by said PCI connection allocating means and generating an interruption to notify said selected physical partitioned computer of a change of said state of logical connection to said I/O device, and

wherein said selected physical partitioned computer, when receiving said interruption, changes its state of logical connection to said I/O device according to said setting by said PCI connection interrupting means.

5       7. The computer system according to claim 5,  
          wherein said computer includes error detecting means  
          for detecting error occurrence in each of said plurality of  
          physical partitioned computers and sends a predetermined  
          control signal to said I/O device switching means when  
10      detecting such an error.

8. The computer system according to claim 6,  
          wherein first and second physical partitioned  
          computers are included in said plurality of physical  
          partitioned computers,

15      wherein said error detecting means, when detecting an  
          error in said first physical partitioned computer, sends a  
          predetermined control signal to said I/O device switching  
          means and connects said port of said I/O device to said  
          second physical partitioned computer, and

20      wherein said computer activates said second virtual  
          machine and lets said first virtual machine stand by.

9. An I/O device connected to a PCI bus of a computer,  
comprising:

          a single port connected to said PCI bus; and

signal generating means for generating an interruption signal used to change the state of logical connection of said port according to a control signal received from said computer,

5       wherein said computer, when receiving said interruption signal, changes its state of logical connection to said port.

10. The I/O device according to claim 9,  
wherein said computer includes first and second  
10 virtual machines formed therein,  
wherein said signal generating means sends an  
interruption signal to said second virtual machine to change  
said logical connection of said port to said first virtual  
machine according to a control signal received from said  
15 first virtual machine.

11. The I/O device according to claim 9,  
wherein said signal generating means generates an  
interruption signal and updates said allocating means for  
setting said state of logical connection of said port.

20       12. An I/O device connected to a plurality of physical  
partitioned computers through a PCI bus, comprising:  
a single port connected to said PCI bus; and  
signal generating means for sending an interruption  
signal to said second physical partitioned computer to  
25 change said state of logical connection of said port to said

first physical partitioned computer according to a control signal received from said first physical partitioned computer included in said plurality of physical partitioned computers.

5        13. A method for sharing an I/O device connected to a PCI bus of a computer among a plurality of virtual machines formed on a control program of said computer,

      said method including:

      a step of enabling said I/O device to set a state of  
10      logical connection between selected one of said plurality of virtual machines and a single port of said I/O device connected to said PCI bus through said single port; and

      a step of changing said state of logical connection between said port and said selected virtual machine  
15      according to a control signal received from said selected virtual machine.

      14. The method according to claim 13,  
      wherein said step of changing said state of logical connection includes:

20        a step of changing said state of logical connection between said port and said selected virtual machine and generating an interruption to notify said selected virtual machine of a change of said state of logical connection of said I/O device; and

a step of enabling said selected virtual machine that receives said interruption to change said state of logical connection to said I/O device according to said setting of said state of logical connection.

5       15. The method according to claim 13,  
wherein said step of changing said state of logical  
connection, when detecting error occurrence in any of said  
plurality of virtual machines, updates an allocation table  
for setting said state of logical connection between said  
10 port and each virtual machine, lets said error-detected  
virtual machine stand by and activate another virtual  
machine.

16. A method for sharing an I/O device connected to a  
PCI bus of a computer among a plurality of virtual machines  
15 formed by partitioning said computer physically,

wherein said method includes:  
a step of enabling said I/O device connected to said  
PCI bus through its single port to set a state of logical  
connection between selected one of said plurality of  
20 physical partitioned computers and said port; and

a step of changing said state of logical connection to  
said port according to a control signal received from said  
selected physical partitioned computer.

17. The method according to claim 16,

wherein said step of changing said state of logical connection, when detecting error occurrence in any of said plurality of physical partitioned computers, updates an allocation table for setting a state of logical connection between said port and each physical partitioned computer, lets said error-detected physical partitioned computer stand by, and activate another physical partitioned computer.

18. A method for sharing an I/O device connected to a PCI bus of a computer among a plurality of virtual machines, wherein said method includes:

a step of enabling said I/O device connected to said PCI bus through its single port to generate an interruption signal used to change the state of logical connection of said port according to a control signal received from any selected one of said plurality of virtual machines; and

a step of changing said state of logical connection between said port and said selected virtual machine according to said received interruption signal.